

How do you engage with and inform children, youth, and adults about agricultural science? Some of us are most comfortable one-on-one, others enjoy groups, and a few are too reticent or feel they are too busy. However you prefer to participate, ARS *must* connect with the public. They learn who we are, what we do, and why it's important – and we learn who *they* are, what interests *them*, and why *that* is important. We also may gain coworkers, colleagues, and stakeholders.

Outreach is one way to nurture change – in us, as well as in the public – and is the focus of this newsletter from your Midwest Area Outreach, Diversity, and Equal Opportunity Committee.

Collaborative Research with Indigenous Peoples

Maize is an indigenous cultivated crop in the Americas. The name is derived from the Arawak term *mahiz*, which means "that which sustains life." Last March, a large gathering of indigenous farmers met at the 9th Annual Great Lakes Indigenous Farming Conference to share knowledge, stories, and seed of their crops, especially native maize landraces. Food insecurity and the need to restore indigenous food and agro-ecosystems were among the many issues highlighted by speakers and echoed by attendees during the meeting.

Participants from different tribes and regions across North America indicated that most landraces of maize have been lost, along with the indigenous knowledge of how to grow, improve and store their seed for future generations. These landraces are the results of thousands of years of cultivation aided by natural and human selection and resulted in the evolution of immense diversity of native maize. Participants strongly emphasized the nutritional value, the many uses, and specific adaptation of the diverse maize landraces their tribes used to grow and especially those which are still in use today. However, the participants were determined, against all challenges and in spite of the loss of large portion of maize diversity, to maintain available diversity and search for and conserve more "hidden" diversity all over North America.

Native Americans believe that the restoration of local food systems can rapidly undo much of the dietary problems faced by their people. In addition, it is considered integral to the restoration of biologically resilient ecosystems

and the development of sustainable economies. The White Earth Land Recovery Project, which hosted the meeting, is working with a number of tribal members and local farmers to grow a few native maize landraces adapted to northern Minnesota. Officials of the project agreed to provide ARS with seed of nine maize landraces to be included in a larger study to evaluate the nutritional quality (macro- and micro-nutrients, protein, oil, carbohydrates) and relate that to the color and physical properties of the seed.

We, at the ARS Research Lab in Morris, Minnesota, carried out a preliminary evaluation of the donated seed samples during the spring season of 2011. This evaluation included seed physical and color characteristics. The variation in seed dimensions was not as large as the variation in their color patterns and composition which ranged from white to purple dark. Certain kernel colors are indicative of the presence and level of certain vitamins and amino acids.

We planted these seed samples at The Swan Lake Research Farm near Morris, Minnesota, to study plant growth and development during the growing season. After harvest this fall, we will re-



Steve VanKempen and Native American maize

examine the same landraces for more plant, ear, cob, and seed characteristics in an effort to find out how they relate to crop yield and nutritional quality and which of these characteristics distinguishes landraces from each other and contributes to their unique qualities.

Results of the initial study carried out on native maize seed suggested that the nine native maize landraces, as a group, differed from three open-pollinated varieties I grow in my home garden and from three other open-pollinated varieties (Nokomis Gold, both with opaque and translucent seed and a cross between AR16021 and B73, which are open-pollinated varieties.)

The native maize landraces differed from the others by having smaller seeds; different color patterns; higher phosphorus, zinc, potassium, but lower magnesium concentration. In spite of the low-input conditions under which these landraces have been grown for generations, protein content was relatively high and ranged from 9.5% in the landrace Hochunk to 13.5% in Seneca Blue Bear. We expect that the on-going field study will provide more seed and plant information so that we may be able to carry out more in-depth evaluation of these landraces. In collaboration with The White Earth Land Recovery Project, we hope to identify ways and means to increase seed while maintaining their genetic integrity.

Abdullah Jaradat, Director, with Jana Rinke, Chemist, and Steve VanKempen, Agricultural Science Research Technician, North Central Soil Conservation Research Laboratory, Morris, MN

A Summer Intern's Experience – New challenges, unknown expectations

My internship with the Plant Science Research Unit in St. Paul, Minnesota, began in May 2010 with new challenges and unknown expectations. The first hurdle that I faced was being a young Hmong woman entering a field that was traditionally occupied by white males. A second challenge that I had to address was that, as a Plant Biology major, I had a strong background in plant sciences, but very little experience in agriculture. During my internship with ARS, I worked on a

number of projects that aimed to improve agricultural sustainability and nutrient cycling in perennial crops, mainly alfalfa. I gained an



enormous amount of hands-on experience in agricultural field research, nitrogen analysis,

and carbon analysis. One of the highlights of our field work was the opportunity to travel to several farms across Minnesota and interact with Minnesota growers. I had initially expected to encounter social barriers with growers and co-workers as a result of my ethnic and educational background, but I found that I was entirely mistaken.

While working for the ARS, I had the unfortunate experience of losing my grandmother. To many employers, funerals may generally be expected to result in a single day absence. Hmong funerals can range anywhere from three to ten days and result in a prolonged absence. In my case, I needed to remain at the funeral for five full days and four full nights, a length of time that was understood with compassion and curiosity by everyone with whom I worked.

The year that I spent with the ARS provided me with the opportunity to expand my education and experiences within plant sciences. As it turns out, I was not the only one who was given an opportunity to grow. Every person that I worked with was introduced to my Hmong culture, a culture that is so prominent here in the Twin Cities and whose livelihood is traditionally based on agriculture. The research that I have done with the ARS has opened up new doors to further an educational pursuit that incorporates my deep-rooted heritage. Agricultural research was a foreign and challenging undertaking for me, but the rewards have outweighed the obstacles.

Anna Yang, Former Intern and Biological Science Aid, Plant Science Research Unit, St. Paul, MN

Photo: Ryan Maher, USDA-ARS, St. Paul

Outreach is part of the job

As summer ends, it's time to think of new beginnings. I know that may sound odd and perhaps most of you never think of the Fall of the year in that way. January 1 always comes to mind as the start of something new. However, each year about this time new school years begin. Undoubtedly this is one of the most important times for all of us. Educating our children, teenagers, and young adults is an exciting challenge, as well as one of the most important things we do in our lifetime.



All of us participate in education in one way or another. A key point to remember is that none of us ever stop learning about the world around us which is why education is a never-ending journey. This ODEO Newsletter issue is called "Nurturing Change" because it highlights outreach, which in my view is a key component of learning. I'm pleased that the MWA Outreach, Diversity, and Equal Opportunity Committee decided to focus on our successes throughout the year in reaching out to inform children, youth and adults about the exciting world of agricultural science. Congratulations to the Committee for putting together an interesting set of articles.

Some of you may ask why ARS should be involved in outreach and other educational activities. After all, our mission is to "conduct research to develop and transfer solutions to agricultural problems of high national priority." For those of you who know our mission statement well, you probably noticed I left out a key phrase in the above sentence. The phrase is "...provide information access and dissemination to" It goes on to list several key points that our research supports. Visit the [ARS website](#) if you're not familiar with the full content of our mission.

The ARS vision is "to lead America towards a better future through agricultural research and information." The term *information* shows up in many places throughout our Agency. We may be

a research organization, but it's clear that part of our responsibility is to inform the citizens of the U.S. about our results and what agricultural research can do for them. All of us should think about how our daily jobs enhance the life of all Americans through science. Take the opportunity to talk to your family, neighbors, and acquaintances about what you do every day and how your role in ARS does make a difference for everyone. Consider volunteering to mentor students and get them engaged in science. Visit your neighborhood schools and let them know what you do.

There are numerous other ways to conduct "outreach" that can make a difference. Take pride in passing along what you know about our amazing ARS accomplishments. Our employees have always been the key to our success. Use your enthusiasm for entering into a science career or deciding to help support our science through your assigned duties to make a difference in how others view our accomplishments. This is an opportunity for us to be not only an exceptional science organization but also one that is proud of our past and excited about the science opportunities of the future. Don't be afraid to pass your enthusiasm along to those around you.

Best wishes to everyone.

[Larry Chandler](#), Director, Midwest Area, Peoria, IL

"Farewell and Best Wishes" to Marie Bishop

For 13 years, the outreach, diversity, and equal opportunity efforts in the Midwest Area have been managed by Marie Bishop, who is retiring at the end of August. Marie brought extensive experience with personnel administration to this job, helping ARS employees make progress in diversifying our workforce, understanding different cultural viewpoints, and appreciating the contributions all of us make. She provided us a steady flow of resources. Thank you, Marie, for your tact; organization; and gentle, persistent encouragement.

The Midwest Area ODEO Committee

Student Researcher Program

**Recipient of the 2010
Midwest Area Equal Opportunity Award**

The Challenge: How could we, at the National Center for Agricultural Utilization Research (NCAUR), Peoria, Illinois, provide a high value experience for high school students who wanted to know more about science and the research being conducted at our facility? The Center has traditionally tried to accommodate local high schools who request a tour for their science classes. A small percentage of local schools requested a tour; however, if all the schools did, the Center could not handle the volume. Additionally, the majority of students who visited were more interested in being out of school than in being in the lab – there wasn't much time to meaningfully engage the students who were truly interested in the science, and the researchers who had interrupted their work to spend time with the group did not see much return for their effort.

The Vision: Our objective was to create a venue that would 1) be equally available to all high school students in the local area, 2) focus on students who already had a strong interest in science and would see the opportunity as a coveted experience to expand on that interest, 3) be rewarding to the participating researchers and encourage them to interact and mentor the next generation of scientists. A leadership team with a unique mix of scientific expertise, familiarity with the educational system and understanding of teenagers was formed to implement and sustain a new approach.

The Program: A Student Researcher Day is held each semester. An invitation to apply to the program is sent to all high schools in the three-county area. To add value to the program, junior and senior students apply and compete for entry; selection is by an internal panel and based on lab science courses to date, application essay, and teachers' recommendation. Meanwhile, NCAUR lab teams made up of a Ph.D. researcher and technician are coached in identifying and preparing lab bench activities that provide insight

into a day in the life of a working research scientist. The activities reflect their actual research project, challenge and excite the students with hands-on use of sophisticated equipment to generate data for analysis, and include the more mundane processes of recording findings in a lab notebook and following proper safety protocols. The preparation includes structured lesson plans and handouts that are part of a "lab notebook" for the students to take home.



Participating students are divided into groups of four and rotate through both chemistry and microbiology labs during a single full-day visit. They work with the NCAUR lab teams to perform the everyday tasks that are part of fulfilling research objectives. Different teams of research personnel provide additional opportunities for interaction by joining the students for lunch, and a presentation on "Careers in ARS" is given.

The Impact: Five Student Researcher Days have been held since the program began in April 2009. Nearly 110 students, including those from traditionally disadvantaged backgrounds, representing 22 different schools, including parochial and home school associations, have participated. Satisfaction surveys indicate a very high level of appreciation. The program has been presented to the Illinois Science Teachers Association and a companion program, "Teachers at the Lab Bench," has been initiated at NCAUR. The goal of this second program is to expand teacher interest in encouraging their students to participate and to further support the efforts and resources of the teachers in their classrooms. The Student Researcher Day has received coverage from the local NBC-TV affiliate and local newspapers, generating increased visibility and

interest. Teachers have used this coverage, and the reports from participating students, in their classrooms to generate discussions about science careers. Requests to apply have come from other communities, including Chicago. Participation within NCAUR includes more than 20 lab teams and 10 lunch teams representing a diverse mix of scientific disciplines, gender, and ethnicity – all experienced in the program so that the workload is shared.

New initiatives: In 2011, new programs are being initiated for Junior High students and one for college students is being explored. Each of these programs will be based on the Student Researcher Day program, yet geared to these groups.

The program has been successfully developed and continues to grow because of the commitment to excellence demonstrated by the planning team, and the desire of many research personnel at NCAUR to meaningfully nurture the next generation of scientists. The ultimate impact



is perhaps best reflected in a student's comment, *"This was a great experience that has helped me make choices for my future."*

Reflection: Adjustments have been made to the original program, some as a result of observation and others as a result of comments from the satisfaction surveys conducted after each event. Being fluid in the layout of the program, willing to re-evaluate how things are done, and making changes when necessary have been instrumental to continued improvement. Some examples include:

Students now eat lunch with their group and 2 or more assigned staff members. Many students said this was their favorite part of the program – the opportunity to talk to scientists on an unstructured social level. We are very intentional about the scientific interactions through the program. We seek employees who love science to

interact with the students and have tried to select a very wide variety of people to participate.

It helps to 'hook' the students when we have them participate in science that is in the news and is popular. Reducing the number of lab sessions from 4 to 3 greatly reduced the stress on everyone, gave each researcher more time with the students and made the day feel less rushed.

The students are greeted with a light snack and PowerPoint presentation in a casual atmosphere. This helps get things off to a more comfortable start. We added a break between the first and second session in response to student feedback--a very positive addition!

What did you think about it?

Students: "The best part was having a lab experience in a real lab with real and friendly researchers ... Thank you for giving me this opportunity to really think about what I want to do in the science industry ... I am so glad I had this opportunity given to me. I feel like it has unlocked many possibilities. I could tell [the scientist] really enjoyed [the work] ... I really enjoyed hearing scientists giving reasons as to why they chose this profession."

Researchers: "The experience of working in the labs makes science outside of academia become attainable, and it becomes a lot less mysterious ... I grew up in the Peoria area, and not until I worked here did I realize what all went on [in this lab] ... It's great to share that there is more to science than just general biology, chemistry, medicine and engineering ... I wish there had been a program like this when I was in school."



Kate O'Hara, Deputy Director for External Relations, National Center for Agricultural Utilization Research, Peoria, IL

A First-Hand Biology Experience

For the past four years, children have witnessed baby chickens hatching in their classroom. Scientists at the Avian Disease and Oncology Laboratory in East Lansing, Michigan, have



brought incubators into preschool, kindergarten, and elementary classrooms and taught the children about chickens, proper handling and care of the baby chickens, genetics, and a little about research and what scientists do.

The children experience the hatching of the chickens for one week in which embryos at 18-days of embryonation are brought into the classroom and allowed to hatch in an incubator. Children initially observe the chick within the egg by illuminating the egg with a flashlight. Then the children witness the chick hatching out of the egg and transforming from a wet, ragged looking chick to a nice, dry, fluffy chick. At the end of the week, the children get the opportunity to observe the chick's behavior and to hold one. For many children this is their first experience with handling a baby chick.

This year, the purchase of a new incubator allowed the children to observe the growth and development of the chick embryo within the egg. For three weeks, a group of 52 children from a first- and second-grade Montessori classroom observed the development of the embryo by looking through a scope attached to the incubator. The children then drew and recorded the growth and development of the embryo until the chick hatched 21 days later. This was very exciting for



the children and complemented their study on life cycles of different species.

Each year our Lab conducts events at four to five different area schools servicing Title I schools, Early Childhood Special Education classrooms, rural districts, and Montessori programs.

Jody Mays, Research Microbiologist, Avian Disease and Oncology Laboratory, East Lansing, MI

Photos: Janet Campbell, Director, Okemos Public Montessori School

Outreach Includes Responding to Inreach

Last year, 6th grader Ethan Hellweg contacted Larry Lockhart, Program Manager of the Plant Introduction Research Unit (PIRU), Ames, Iowa, regarding a science fair project that he was considering. Ethan wanted to compare the pollination efficiency of honey bees and butterflies on cucumbers and marigolds. With advice from Steve Hanlin, Entomologist of the PIRU, and the loan of some old equipment from Larry, Ethan designed an experiment using controlled pollination cages to compare the two pollinators. He took measurements of the yield of cucumbers and marigolds to determine which pollinator produced the highest yields.

Ethan won a local and regional science fair with this project, which qualified him for the Iowa State



Science Fair. He placed first in "Seminar" and first in "Floor Display" among 7th graders at the Iowa State Science Fair. He also won Reserve Champion of the Junior High division and was awarded a \$500 scholarship for his efforts. Ethan is the son of Rita and Larry Hellweg of West Point, Iowa.

Larry Lockhart, Program Manager, North Central Regional Plant Introduction Station, Ames, IA.

“He complained all the way there.”

As a USDA-ARS scientist, one of the most rewarding experiences for me has been serving and teaching the public about the research being done at the Vegetable Crops Research Unit (VCRU), Madison, Wisconsin. I have been involved in ARS outreach since I was a graduate student and have participated in many outreach and community service activities, from Science Day for Kids to Science Nights, and designed Exploration Stations for kids and their families. It is so much fun that my wife and kids often join in the events, making it a family activity.

One particularly memorable outreach event happened during graduate school. I was invited to participate in a community Science Night to be held at Edgewood College, which has Exploration Stations representing different science disciplines and poster presentations of high school science research. I wanted to show families the variety of agricultural research in my unit, so I gathered



representative crops from the VCRU, such as diverse carrots, potatoes, cucumbers, and onions, to excite them about plant

breeding. My wife, Leah Zalapa, a physician, also participated. She talked about cardiology using a plastic model of the human heart.

We were all having a great time with the families when we were greeted by Kim Meyers, our Program Support Assistant at VCRU, and her youngest son. I explained to Kim's son the importance of plant breeding to feed the world and showed him many accomplishments at the VCRU involving the crops represented in my station. Later that week, Kim told me, “I thought my youngest son would be excited to go, but not so. He complained all the way there; but once he saw all of the interesting stuff on the tables, I could hardly keep up with him. The first thing he saw was the model of a heart. Leah explained the

different parts to him and asked him if he wanted to take a test of what he just learned, which of course he took. From there we went to all the different stations, we learned a lot, saw a lot, and had fun ... we were among the last to leave that night. It was a great experience for both of us.”



For me as an ARS scientist, serving my community and country is very important, and that is why I do science outreach. It was especially gratifying to serve a colleague and her family.

Juan E. Zalapa, Research Geneticist, Vegetable Crops Research Unit, Madison, WI

And the winners are....

Scientists, technicians, and cooperating graduate students at the St. Paul Location have a long practice of judging science projects in the Twin Cities. These include local elementary and junior high school fairs, including a [private Islamic school](#), the Twin Cities Regional Science Fair, and [National American Indian Science and Engineering Fair](#). The enthusiasm of these earnest students is inspiring, and some of the projects have been amazing.

For nearly 15 years at the Regional Fair, we have selected the best projects in plant, soil, and environmental science for 6th grade, junior high, and senior high categories to receive ARS awards. A team of 4 to 6 reviews scores of projects during the 5-hour-long judging period – an exhausting, but rewarding effort. At the awards ceremony, we introduce ARS to the hundreds of parents and family members and then summarize the importance of each project as the students walk in to receive the award.

Michael Russelle, Research Soil Scientist, Plant Science Research Unit, St. Paul, MN

Activities/Observances

African-American History Month

Employees at the National Center for Agricultural Utilization Research in Peoria, Illinois, were both entertained and educated by a presentation by Mrs. Sharon Samuels Reed, the Founder and Artistic Director of the Heritage Ensemble and Youth Heritage Ensemble of Central Illinois. Her unique style of “edutainment” combined lecture and recorded music, taking the listener on a journey of the Negro Spiritual from its inception with the Antebellum slave to the concert hall as a lasting art form. As each inspirational song was presented, it brought to life how these timeless spirituals have gone from expressions of dealing with extreme hardship, to ones of uniting people during the Civil Rights movement, to tearing down walls and building bridges, still mindful of the work that remains to be done.

Ms. Reed discussed various styles of Negro Spirituals from historical and musical perspectives, including the Call and Response, Slow and Melodic, and Fast and Rhythmic, prior to playing the CD soundtracks. It was especially interesting to gain a greater understanding of how the various genres of music, gospel, blues, and jazz, were blended together in various arrangements from the 1800s to the present.



The combined choirs of the Heritage Ensemble and Youth Heritage Ensemble in the DVD “Lift Every Voice and Sing” captivated the audience and allowed them to hear songs that have been with us for generations as expressions of both appreciation and inspiration. Perhaps the song that brought back the most memories was “We Shall Overcome.” The song “Meditation” was a great example of the genius of Duke Ellington,

and served to provide a final calming spirit before parting company.

Mrs. Reed’s presentation, sponsored by the Civil Rights Employee Development Organization, showed how music can be engaging in a way that celebrates diversity while giving credence to the struggles of the past.

*Mark Klokenga, Physical Science Technician,
National Center for Agricultural Utilization Research,
Peoria, IL*



This newsletter was compiled by members of the Midwest Area Outreach, Diversity, and Equal Opportunity Committee:

Claire Baffaut (Columbia),

Nancy Barbour (Morris),

Marie Bishop (Peoria),

Danielle Cooley (West Lafayette),

Kris Foight (East Lansing),

Leona Horst (Columbus/Coshocton/Wooster),

Mark Klokenga (Peoria),

Michael Russelle (St. Paul),

Robert Stebbins (Ames),

Jean Weinbrenner (Madison), and

Marty Williams (Urbana).

*Please contact one of us with comments, suggestions,
and offers to get involved!*



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